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## NEW MICHIGAN TICK (ACARI: IXODIDAE) AND FLEA (SIPHONAPTERA: CERATOPHYLLIDAE) RECORDS FROM COLONIAL NESTING BIRDS

William C. Scharf<sup>1</sup>

## ABSTRACT

Banding and censusing large numbers of gull chicks over a 30-year period on Great Lakes islands has produced a collection of five individual ticks from two Herring Gull (*Larus argentatus*) chicks. The tick species, *Hemaphysalis leporispalustris*, found on the gulls is commonly found on Snowshoe Hares (*Lepus americanus*). Although this represents an apparently uncommon record on Herring Gulls, this host could be an important source of aerial vector dispersal during regular cyclic hare/tick population peaks. Populations of the flea, *Ceratophyllus lari*, have increased rapidly in ground nesting Double-crested Cormorant (*Phalacrocorax auritus*) colonies from none 16 years ago. The possibilities of disease transmission by both of these hematophagus ectoparasites are assessed with evidence from the literature. The tick and flea distributions reported here are new host records, and the flea is a new species record for Michigan.

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The following tick and flea distribution studies in Michigan and its Great Lakes islands were consulted to confirm the data reported here: Lawrence et al. 1965, Wilson and Johnson 1971, Scharf and Stewart 1980, Scharf et al. 1990, Scharf 1991, 1998; Scharf and Lederle 1998 and Walker et al. 1998. The goal of this paper is to further the knowledge of distribution records of ticks and fleas and their hosts from Michigan. Secondly, I point out possible transmission of disease to newly reported Michigan hosts by their recently noted ectoparasite vectors.

## MATERIALS AND METHODS

I collected ticks and fleas opportunistically by examining nestlings and fecal nest debris during banding and census operations of at least 30,000 gulls and 10,000 cormorants on islands spanning all of the Michigan Great Lakes between 1968 to present (for list of sites visited see Scharf and Shugart 1998 and Scharf 1998). The specimens accounted for here were collected from bird colonies on islands in Leelanau and Charlevoix counties.

Ticks were picked up with forceps or an alcohol wetted finger. Fleas were sampled by gathering small amounts of fecal nest debris in a plastic bag, and later sorting it in a white porcelain dish. All ticks and fleas were stored in 70% ethanol, and later cleared and mounted in Canada Balsam on glass

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slides for microscopic identification. Ticks were identified using Sonenshine (1979). Tick slides are vouchered with specimens deposited in the National Tick Collection at Georgia Southern University. Flea specimens were identified using Holland (1951). Flea slides are vouchered with specimens deposited in the University of Manitoba Entomology Collection. Bird names are according to the American Ornithologists' Union Checklist (1998). Mammal names are according to Jones et al. (1992).

## RESULTS

### ACARI: IXODIDAE

*Haemaphysalis leporispalustris* (Packard), Herring Gull, *Larus argentatus* Pontoppidan nestlings (2), High Island, Charlevoix County, MI, 45° 44'N, 85° 38'W, 1 nymph, 5 larvae, 18 June 1977, (NEW MICHIGAN HOST).

### SIPHONAPTERA: CERATOPHYLLIDAE

*Ceratophyllus lari* Holland, from fecal debris at nests of Double-crested Cormorant, *Phalacrocorax auritus* (Lesson), with eggs, Bellows Island, Leelanau County, MI, 45° 06'N, 85° 34'W, 2 ♂♂, 4 ♀♀, 14 April 1997, and 36 ♂♂, 67 ♀♀, 20 April 1999, (NEW MICHIGAN FLEA and NEW MICHIGAN HOST).

## DISCUSSION

**Ticks.** *Hemaphysalis leporispalustris* is a 3-host tick with adults normally restricted to lagomorphs. Sonenshine and Stout (1970) report 40 species of birds as hosts of immature stages of this tick in Virginia. However, I found no records of this species from birds in the family Laridae (gulls and terns). Pierotti and Good (1994) report *Ixodes* spp. ticks from Herring Gull chicks.

Green et al. (1943) reported an average of 5,000 ticks of this species per Snowshoe Hare during cyclic population highs in Minnesota. Severe tick infestations of Snowshoe Hares, similar to the Minnesota records, are frequently found on Lake Michigan islands (Scharf unpubl. notes and photos). Scavenging adult gulls could easily acquire questing immature ticks by feeding on an infested dead hare carcass and then passing the ticks when feeding their nestlings.

The date of collection reported here for 4 larvae are contrary to the activity phenology of larvae of *H. leporispalustris* in Virginia, where temperatures are higher and seasons longer (Sonenshine and Stout 1970). There, no larvae were found between May and September. Nymphs peaked in late spring there, but continued at low levels through the summer months, which could be consistent with this report.

Although no evidence of disease transmission exists for *Hemaphysalis leporispalustris* infesting Herring Gulls in Michigan, the tick is involved in the transmission of Rocky Mountain spotted fever and tularemia among wildlife (Sonenshine 1979), and has been shown to carry the Lyme disease pathogen, *Borrelia burgdorferi* Johnson, Schmidt, Hyde, Steigerwalt and Brenner (Rand et al. 1998). The latter pathogen would only be important to humans to the extent that other species of human-biting ticks shared the

same hosts. Additionally, seven tick-borne viruses are known from the holarctic Herring Gull (Nuttall 1984).

**Fleas.** Double-crested Cormorants began a re-colonization of the upper Great Lakes in the early 1980s after near extirpation (Scharf and Shugart 1981). By 1984, J. P. Ludwig (pers. comm.) began to notice blood-speckled feet and eggs where large numbers of fleas had been feeding on the cormorants as they incubated their eggs. This was especially evident at sites where ground nesting became the predominant nest substrate. Ground nesting became necessary due to tree death from fecal phytotoxicity of burgeoning numbers of cormorants (Scharf and Shugart 1998). Newcastle disease, a paramyxovirus, found in blood, but usually transmitted by inhalation of viral infected fecal material, causes paralysis which has killed thousands of cormorants (Glaser et al. 1999, Kuiken et al. 1999). It has also spread from cormorants to domestic poultry in North Dakota (Heckert et al. 1996). It remains to be proven whether blood-to-blood contact caused by *C. lari* feeding may help spread the virus from bird-to-bird, or whether the bite lesions offer a portal for fecal virus invasion.

No systematic quantification of the number of fleas per nest (est. size of nests, 0.50–1.2 m<sup>3</sup> and 10–15 kg) has yet been attempted. Anecdotal flea density in cormorant nests in the collection from 20 April 1999 amounted to three hands-full of fecal debris (from three nests incidental to banding neighboring Herring Gulls) from which more than 103 fleas were collected. No larvae or pupae were observed. Ambient temperature was about 8° C, and many fleas began to copulate, perhaps stimulated by additional warmth of the black plastic bag used to transport the fecal debris. Whether the approximate sex ratio observed as 65F:35M, from the 103 fleas slide mounted, is maintained awaits future collections.

Holland (1951) described *C. lari* from collections of gull nests (either *L. argentatus* or the California Gull, *L. californicus* Lawrence) on Whaleback Island, Great Slave Lake, NWT, Canada. Previously, a single female identified as *C. lari* by T. Galloway (pers. comm.) was collected by D. V. Weseloh at Cone Island in Lake Superior near Thunder Bay, Ontario from a Double-crested Cormorant nest. However, Hatch and Weseloh (1999), in their North American account of the Double-crested Cormorant, cite Easton's (1982) record of *Ceratophyllus niger* Fox as the only siphonapteran parasite for Double-crested Cormorants, and Hobson (1997) records *Ceratophyllus pelecani* Augustson for the Pelagic Cormorant (*P. pelagicus* Pallus). From drawings and descriptions in the literature, all three flea species appear very similar. T. Galloway (pers. comm.), who also identified my specimens as *C. lari*, cites the larger frontal tubercle of *C. lari*, and a very short vexillum in males compared to those of *C. niger*. Female *C. lari* have greatly enlarged abdominal spiracles. Further, *C. niger* and *C. pelecani* have western distributions, and *C. lari* is from distinctly eastern and Great Lakes localities.

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